Big 6 Range AMP Project
Wildlife Specialist Report

Prepared by:

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Project Wildlife Biologist **Date**

Introduction

This document analyzes the effects to the Species of Local Concern, Demand Species, and Management Indicator Species (MIS) as identified in Appendix C of the Forest Plan (2005) relative to the Big 6 Allotment Management Plan (AMP) revision project. In addition, birds listed on the USFWS list of Bird Species of Concern (USFWS 2002), and in the Wyoming Partners in Flight Conservation Plan (Cerovski et al. 2001) are also addressed in compliance with the Executive Order (2001 – EO 13186) for migratory birds, though primary compliance with this is addressed at the Forest level in the Forest Plan (USDA 2005). Analysis for threatened, endangered, or Forest Service sensitive species (TES) is contained in the Biological Evaluation prepared for this project. Refer to the EIS prepared for this project for information on project location, setting, and proposed activities. Cumulative effects assessed for this project as mentioned in the EIS also pertain to this analysis and are incorporated by reference.

Rationale for selection of these species and the viability determinations for the species at risk (Local Concern) were analyzed in the Forest Plan FEIS and supporting documents, including ecological and species assessments, to which this document is tiered to and incorporates by reference. The levels of management activity (e.g. prescribed burning, timber harvest, livestock grazing) assessed for the Forest Plan provide the context in which viability was analyzed, and this project falls within the level of activities analyzed in the Plan FEIS. In addition, information and effects as portrayed for Demand and MIS species in the Plan FEIS are also incorporated by reference. Individual species assessments for emphasis species prepared from the Regional Species Conservation Project assessments are also incorporated by reference. These documents provide details on habitat and potential effects from management activities. Current status of MIS habitat and population information is also summarized in the annual Forest Plan monitoring report, to which this document is tiered and incorporates by reference.

Information on species occurrences is from WYNDD (Wyoming Natural Heritage Diversity Database 2008) and WOS (Wyoming Observation System, Wyoming Game and Fish Department 2008) in addition to field reviews conducted for this project by the specialists involved. Other avian species presence or absence in the project area were determined by a combination of field surveys, and publications such as Downing (1990), Merrill (1997), BBS records (Sauer 2005), WYNDD (2008), and National Geographic Field Guide (1999). In 2002, the Forest also began avian point count surveys to monitor avian species of concern and MIS (RMBO 2008), and some transects for this occurred in the project area. Wildlife surveys were conducted by Wildlife Biologists Matt Moran and Jon Warder, and seasonal technicians, during the summers of 2007 and 2008. Some of the project area was additionally surveyed in 2005 under the Hunt Mountain Travel Management Plan. This project was also coordinated with the Wyoming Game and Fish Department (WGFD), primarily via Tom Easterly, wildlife biologist, and Jerry Altermatt, habitat biologist, involving several field trips to the project area.

Proposed Action and Alternatives

Refer to the EIS for the current description of alternatives and design criteria, and adaptive management strategies and the allotments to which they apply. In general, the 3

alternatives considered in this analysis include: 1) No Action; 2) Continued current livestock grazing; and 3) Livestock grazing with adaptive management strategies and vegetation treatment (prescribed burning in timber and sagebrush, mechanized treatment of sagebrush, and mechanical treatment of timber next to cow camp structures).

Under Alternative 3 approximately 1500 acres of treatment of sagebrush would be needed to be within recommended guidelines (Wyoming Interagency Vegetation Committee 2002). Alternative 3 also includes treatment for fuels reductions, conifer encroachment, aspen improvement, treatment of dead and dying timber caused by insect and disease, and treatments for spike moss. These projects would be designed in cooperation with WGFD and would maintain 2005 Forest Plan standards and guideline as discussed for individual species below as well as in the Biological Evaluation for this project. Identified areas for treatment can be found in Chapter 2 of the EIS. It should be noted that most of the project area where treatments are proposed is within "roadless" and the most cost effective and beneficial available tool for treatment is prescribed fire.

Field Work

Grazing allotments were visited in person by Matt Moran, District wildlife biologist. Surveys for some sensitive species were also conducted by him and seasonal wildlife technicians that also informed the analysis for the species in this analysis. Additionally, a portion of this project area was surveyed in 2004-2005 for the Hunt Mountain Travel Management Plan.

Consultation with Other Experts, Agencies or Organizations

Public scoping was conducted in March of 2007. Comments or concerns received from that effort were incorporated into this analysis.

The Wyoming Game and Fish Department Wildlife Observation System (WOS) database was queried for all reported wildlife sightings in the analysis area.

An updated list of wildlife occurrences on the Bighorns was obtained from the Wyoming Natural Diversity Database (WYNDD).

A letter was received from the U.S. Fish and Wildlife Service in 2010, with an updated list of Threatened or Endangered wildlife species that may occur on the Bighorn National Forest. Determinations for Threatened, Endangered, and Sensitive species are contained in the Biological Evaluation for this project.

Discussions with Wyoming Game and Fish Department about prescribed fire plans and objectives within sagebrush and timber. Per WGFD recommendations, prescribed treatment of sagebrush should follow the guidelines for managing Vasey and Mountain Big Sagebrush (Wyoming Interagency Vegetation Committee 2002).

Analysis Procedures:

Comments from interdisciplinary team meetings, scoping, and field trips were summarized and condensed. Once the relevant concerns had been identified, analysis was focused to address effects of the proposed actions on those resource areas.

Wildlife concerns raised by scoping with individuals and agencies outside of the Forest Service:

1. Critical habitat characteristics for some species of wildlife can be affected by livestock grazing. Grazing can affect habitat in two ways; by altering the species mix and vegetation types present on a specific piece of ground, and by altering the amount and arrangement of vegetative cover.

2. Effects of livestock grazing on Species of Local Concern, Demand Species, and Management Indicator Species.
3. Concerns of current or future infestations from noxious or invasive species and conifer encroachment, which may result in a loss of forage condition.

4. Effects of livestock grazing on deer and elk winter range. Part of the analysis area includes deer and elk winter range. The issue to be analyzed is potential effects of alternative grazing schemes on the amount and availability of forage for big game animals during crucial winter months.

Forest Plan Direction

Management direction (goals, objectives, standards, guidelines, monitoring) for emphasis species when implementing projects is found in the Forest Plan. This project meets the goals and objectives by seeking to restore vegetation and watershed conditions through reduced likelihood of widespread wildfire occurrence (fuels reductions) and improved habitat diversity of structural stages. Surveys conducted for the project improved knowledge regarding emphasis species. The following synopsis of plan direction applicable to this project is as follows:

The following **objectives** and **strategies** are those that most directly relate to project level design and analysis for emphasis species:

Objective 1.a: Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses.

Strategies: 1, 2, 6, 7, 8, 9

Objective 1.b: Provide ecological conditions and habitat within the ecological capability and disturbance regimes of the Forest to sustain well-distributed viable population of native and desired non-native emphasis species listed in Appendix C of the Forest Plan.

Strategies: 1 – 11.

Objective 1.c: Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species.

Strategies: 1 – 4, 6

Objective 2.c: Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, and services

Strategies: 1-2

There are also **standards and guidelines** in the Forest Plan that provide sideboards to project design that affect plant, fish and wildlife habitat. Where these standards or guidelines cannot be met in a project, disclosure and rationale are required in NEPA analysis. Only standards and guidelines that cannot be met in this project are described below, otherwise all are met. Standards and guidelines occur in Chapter 1 and Chapter 2 of the Forest Plan. Conservation measures identified in the Bird Conservation Plan were also considered for those species analyzed, as a part of their habitat requirements, and were considered in the development of the Forest Forest Plan direction (standards and guidelines). The following are forestwide standards and guidelines applicable to emphasis species and this project's proposed activities:

Physical/Geology-Caves: Standard 1
Physical/Soil, Riparian, and Wetland: Standards 1 & 2, Guidelines 1 & 4.
Biological/Biological Diversity: Guidelines 1 – 7, 9 & 10.
Biological/Fisheries: Guidelines 1 – 3.
Biological/Rangeland Vegetation: Standard 4
Biological/Rangeland Improvements: Standard 3; Guidelines 4, 7, 8
Biological/Silviculture: Guidelines 2, 3
Biological/Wildlife: Guidelines 1, 3, 5 – 7, and 9 – 12
Biological/Non-native and Invasive Species: Standards 1, 4, 5;
Administrative/Infrastructure – Travelways: Guideline 7.

M**anagement area prescriptions** occur in the project area, with implementation direction occurring in Chapter 2 of the Forest Plan. These management areas contain additional standards and guidelines, and desired future condition statements that guide project implementation.

Prescribed Fire Guidelines for Proposed Action (Alternative 3)

Large areas have been identified for possible treatment within the Beaver Creek and Little Horn areas of the overall project, the following guidelines and recommendations would be implemented in addition to existing Forest Plan direction:

1. Implement sagebrush management to increase habitat diversity and forage for wildlife and livestock. Treatment of sagebrush would follow Wyoming Interagency Vegetation Committee guidelines for Vasey and Mountain Big Sagebrush (Wyoming Interagency Vegetation Committee 2002) per Wyoming Game and Fish Department recommendations (Altermatt 2008, Easterly, 2008). Burn Plans would be developed in coordination with Wyoming Game and Fish Department This would also become effective within sagebrush units identified in the Hunt Mountain Prescribed Burn EA, within this project area.
2. Mechanical treatments will be restricted from operation from April 16 to July 15 to protect nesting avian species.
3. Use of herbicides should be minimal and restricted only to places where prescribed fire and mechanical treatment are not feasible.

Species of Local Concern and Demand Species Analysis

The following tables provide an analysis of effects to wildlife species of local concern and demand species identified in the Forest Plan (Appendix C). Descriptions of how these species were selected are displayed in the Forest Plan and FEIS. In general, Demand species are those species for which a public demand occurs, typically from a hunting/gathering perspective. Local concern species are those that may be locally unique or at risk based on state level heritage database rankings or other criteria, and yet do not warrant consideration as part of the Forest Service sensitive species list. Additional analysis beyond what occurred for Forest Plan revision, in terms of selection of these species and their limiting factors, has occurred at the Regional level, with factors displayed for recommending these species' consideration at the local (Forest level) scale. Analysis for MIS follows this section. Appendix A lists the vegetative structural stages for overall habitat components by each cover type.

Table 1. Bighorn NF Local Concern Species - Habitat, Occurrences, Effects

2005 Forest Plan - Species of Local Concern

Mammals

Species	Habitat	Status*	Project Occurrence	Effects/Determination
Long-eared myotis	Caves/mines	G5/S1	None known to project area, but known to Forest.	For bat species, refer to the BE for discussion of effects applicable to similar bat species (big-eared bat). This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.

Hoary bat	Aspen/ conifer, snags	G5/S2B/ SZ/N	None known to occur, and limited potential habitat. Due to lack of aspen on the Forest, there may be less potential than in other areas of the state.	Project activities in alternative 3would result in increases of snag resources associated with prescribed burning activities to remove timber encroachment into meadows and to treat insect and disease. An abundance of snags occur in the project area. Aspen habitat would be enhanced through this project. Minimal direct/indirect effects. Effects would be negligible/discountable in alternatives 2 and 3, and no effects from alternative 1. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.
Birds				
Common loon	Wetland/ lake	G5/S1B/ SZN	No known observations in project area, limited potential habitat.	No effects to lake resources from project. No additional disturbance around lakes from project. No effects to species. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.
Swainson's hawk	Grassland, riparian	G5/S4B/ SZN	Likely occurrences in project area meadows.	Burning in alternative 3 could result in short term disturbance (direct/indirect effect), but would not likely occur during breeding season. Burning would also help maintain mosaic of habitat, a beneficial effect. No effects from alternative 1. Alternatives 2 and 3 with livestock grazing standards and guidelines should allow for continued potential habitat for this species. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.
Great gray owl	Mature conifer	G5/S2	Potential habitat in project area (snags on edge of meadows and old growth). No known occurrences.	Project activities in alternative 3 would result in increases of snag resources associated with prescribed burning activities to remove timber encroachment into meadows, and create age class diversity in timber stands. An abundance of snags occur in the project area. Minimal potential for direct/indirect effects with alternatives 2 and 3 based on lack of known occurrences. Prey habitat would be maintained in alternatives 2 and 3 with grazing standards and guidelines. There would be no effect from alternative 1. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.

Pygmy nuthatch	Mature conifer/ snags	G5/S2 S3	Potential habitat, but no known sightings.	Effects similar to great gray owl. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.
Calliope humming-bird	Riparian/ Meadow/ Conifer	G5/S2B/ SZN	No known occurrences, but potential habitat.	No direct/indirect effects to riparian from mechanical treatment or prescribed burning in alternative 3. Burning would have short term direct/indirect effects in meadow habitat, but also restore more natural mosaic and age class diversity to habitat. Direct/indirect effects are possible to conifer habitat thru prescribed burning treatments, however long term benefits of habitat improvement would occur through age class diversity. Livestock grazing could have effect to riparian associated foraging habitat. Alternative 1 would have no effect from livestock grazing, while alternatives 2 and 3 would allow for grazing according to Plan standards and guidelines which should maintain potential habitat for the species. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.
Golden-crowned kinglet	Spruce-fir	G5/S3	Known through limited occurrences.	Direct/indirect effects to spruce-fir habitat from prescribed burning in alternative 3 are possible. May have short term effects to individuals, but long term benefits through improved age class diversity of habitat. This project would not change the conditions associated with the viability determination made in the Forest Plan FEIS for this species.

NSS = Native species status; state ranking; numbers 1 through 3 indicate those species recognized as high priorities for conservation action, with a 1 indicating possible extirpation.

PIF = Partners in Flight; state ranking; levels I and II identify species which may be of viability concern.

SSC = Species of special concern; derived primarily from the Fine Filter Analysis for the Bighorn National Forest (Welp et al 2000).

G = Global rank, based on the rangewide status of a species. **T** = Trinomial rank, based on the rangewide status of a subspecies or variety. **S** = state rank, based on the status of a taxon in Wyoming (state rank may differ in other states). **1** = critically imperiled because of extreme rarity or because of some factor of a subspecies' life history that makes is vulnerable to extinction. **2** = imperiled because of rarity or because of factors demonstrably making a species vulnerable to extinction. **3** = rare or local throughout its range or found locally in a restricted range. **4** = apparently secure, although the species may be quite rare in parts of its range, especially at the periphery. **5** = demonstrably secure, although the species may be quite rare is parts of its range, especially at the periphery. Source: Wyoming Natural Diversity Database (WYNDD), 4/29/2007.

Table 2. Bighorn NF Demand Species – Habitat, Occurrences, Effects

2005 Forest Plan - Demand Species

Mammals

Species	Habitat	Status*	Project Occurrence	Effects/Determination
Mule deer *Odocoileus hemionus*	Generalist	G5/S5	Known and wide-spread. Stable population forestwide in 2009.	Direct and indirect effects to habitat thru fire and mechanical treatments in Alternative 3. However, effects are similar to natural disturbance processes and would maintain habitat through time for this habitat generalist. The utilization standards and stubble height requirements in alternatives 2 and 3 for grazing should serve to minimize competition for forage between livestock and mule deer as well as other wildlife species. Short term disturbances through project activities may displace deer from localized areas. Short term reductions to winter cover may occur where burning is proposed, however this will increase winter forage. Long term benefits by treating insect, disease, and fuel loading. Approximately 20,000 acres of deer and elk winter range exists within the project area. Sections of dead and dying timber are not providing thermal cover as they could, and most of the timber is in older structural stages. Cumulative effects from noxious weeds may have potential to increase, however mitigation should prevent this. Otherwise, this project would not increase cumulative effects above those analyzed in Forest Plan FEIS.
Moose *Alces alces shirasi*	Willow, riparian and conifer	G5/S5	Known and wide-spread. Stable – Increasing population	Potential competition for forage with livestock grazing in alternatives 2 and 3. Utilization standards and guidelines would provide habitat protection in these two alternatives. No effects in Alternative 1. Spruce-fir effects from burning in alternative 3 similar to mule deer. This project would not increase cumulative effects above those analyzed in Forest Plan FEIS.

Black bear *Ursus americanus*	Generalist	G5/S5	Known and wide-spread. Stable population	Effects would be similar to those for mule deer above. Current roadless areas likely minimize human disturbances.
Mountain lion *Felis concolor*	Generalist	G5/S5	Known and wide-spread. Stable population	Effects would be similar to those for mule deer above. Current roadless areas likely minimize human disturbances.
Birds				
Ruffed grouse *Bonasa umbellus*	Forested areas/riparian	G5/S5	Not likely in project area, but potential habitat.	Effects would be similar to mule deer above.
Blue grouse *Dendragapus obscurus*	Spruce-fir	G5/S5	Known and wide-spread population in Forest. Known to project area.	Effects would be similar to the mule deer described above.
Merriam's turkey *Meleagris gallopavo merriami*	Ponderosa pine	G5/S5	Not known to occur within the project area. Potential habitat in project area.	No proposed disturbances in ponderosa pine cover type in Alternative 3. No effects from Alternatives 1 and 2. Otherwise, effects would be similar to the mule deer described above. This project would not increase cumulative effects above those analyzed in Forest Plan FEIS.
Gray partridge *Perdix perdix*	Prairie, meadow, shrub	G5/S5	Not currently known to project area and no likely potential habitat.	No effects anticipated due to lack of potential habitat and no known occurrences. This project would not increase cumulative effects above those analyzed in Forest Plan FEIS.

Plains sharp-tailed grouse *Tympanuchus phasianellus*	Grassland, mountain shrub	G4/S4	Known in the southeast corner of the Forest. No known occurrence in project area, nor potential habitat.	No effects from any of the alternatives anticipated due to lack of potential habitat and no known occurrences.
Chukar partridge *Alectoris chukar*	Grassland, mountain shrub	G5/S5	Potential habitat in lower elevations of Forest.	Prescribed fire may temporarily displace birds. Direct/indirect effects would be minimal to overall habitat in project area. Effects otherwise similar to mule deer.

Management Indicator Species (MIS)

The use of Management Indicator Species (MIS) is a concept developed for forest planning purposes to evaluate, manage for, and monitor fish and wildlife resource response to management activities as described in the 1982 forest planning regulations (36 CFR 219.19, 219.26, and 219.27 (a)(6)) as part of overall ecosystem diversity. They can help serve as a surrogate for assessing effects and managing for all species in general. Most direction in the 1982 regulations for MIS is designed for the development of forest plans, to which the 2005 Forest Plan for the Bighorn NF complied. This project is implemented under the Forest Plan, following plan direction for MIS as noted in the beginning of this document. Additional information pertaining to MIS and projects occurs in Appendix C of the Plan under the heading "Plan Implementation". The analysis below and the overall project design demonstrate compliance with the Forest Plan expectations for MIS. Furthermore, a Deciding Officer's Checklist for MIS was developed by the Rocky Mountain Region for use during project analysis and implementation. This checklist was adhered to for this analysis.

Additional direction for MIS and plan implementation occurs in the 2005 forest planning regulations at 36 CFR 219.14(f), and is applicable to the Bighorn's Forest Plan developed under the 1982 regulations. This direction specifically states that the appropriate scale for monitoring and surveying for MIS is at the Forest level (not individual project) and that monitoring may consider the use of habitat based methods, unless specified otherwise in the Plan, in lieu of population based methods. The Bighorn's Forest Plan was designed to incorporate this as evidenced in the monitoring section (Chapter 4). Forest-wide monitoring for the five species other than elk was begun in 2002 due to an amendment to the 1985 plan conducted. Most of these practices are continuing under the 2005 Forest Plan, though avian monitoring was scaled back after 2007 due to inconclusive results and associated costs. Elk populations are monitored annually by the Wyoming Game and Fish Department with published results. The Annual Forest Plan Monitoring and Evaluation Report contains the assessment of current trends in habitat and/or populations currently available relative to the Forest scale, and are incorporated by reference to this analysis. It should be noted that the MIS concept incorporates many potential sources for error and uncertainty, due to the vast changes in habitat and populations that may occur in a given year due to climate or other non-management related effects. Even at the most robust monitoring levels, conclusions of population trends or habitat trends tied to management would inherently be uncertain due to these associated sources of error or "noise".

The anticipated effects of the proposed alternatives to MIS would serve to determine project effects to wildlife resources within the Analysis Area. In order to be effective for project level analysis, management indicator species or their habitat should be present within the analysis area, and respond to project associated activities. The Forest Plan (Appendix C) lists six species as potential MIS for assessing project level effects. They include beaver, elk, red squirrel, rainbow trout, Brewer's sparrow, and red-breasted nuthatch. Rainbow trout will be discussed in the Fisheries Specialist Report for this project. The following section contains species specific analysis for MIS related to the

two action alternatives, as the no action alternative would have no effects other than existing cumulative effects as acknowledged in the Forest Plan FEIS.

Beaver

Beaver occur in the project area, though probably in more limited extents than what historically occurred. Grazing activities in riparian areas, where willow or aspen may be suppressed, particularly in conjunction with wildlife browsing, could affect potential beaver habitat. These potential effects would not occur in alternative 1. Alternative 2 and 3 would have livestock grazing standards and guidelines, which should allow for habitat conditions for beaver to persist. Alternative 3 would likely result in better conditions more rapidly than alternative 2 due to adaptive management options to minimize potential effects. No mechanized treatment or prescribed burning effects would directly affect beaver habitat as riparian habitat is not targeted in these treatments in alternative 3.

An aerial survey on the Forest (combined fixed-wing and helicopter) was conducted in 2003, using GPS to inventory active caches. This survey estimated approximately 200 animals, using a multiplier of 4.5 beaver per food cache observed (Emme and Jellison 2004). The 200 animals also includes a multiplier of 40%, as that was an estimate used in similar surveys in other areas to estimate the number of caches missed from the air (Rutherford 1964; Payne 1984). This survey also includes approximately 32 beaver reintroduced on the Forest from 2000 and 2003. In 2010, this survey was repeated (WGFD 2010), with a total of 171 beaver estimated, even after the reintroductions. It was not known or estimated if the decline is due to habitat or predation or disease or a combination of all of them. Regardless, there are fewer beaver now than what was likely present historically, as demonstrated in the species assessment conducted for the Forest Plan FEIS.

Cumulative effects to beaver habitat that are foreseeable would be be replacing culvert pipes within the project area. These would be installed to FS specifications to minimize possible effects to aquatic and riparian species. No project activities would cumulatively affect those populations or their habitat.

Due to the lack of significant effects to beaver or their potential habitat, this project would have no effect to beaver populations or habitat trend relative to the forest-wide scale as displayed in the Forest Plan monitoring report or the 2005 Forest Plan. Reintroductions of beaver to improve populations would continue regardless of this project, but there have been no potential sites identified in this project area for beaver reintroduction due to the more limited amount of riparian area habitat. Plan direction for this species was incorporated into project design.

Elk

Management direction for elk in the Forest Plan occurs in the provision of elk security habitat as described in the strategy listed above, and by forestwide wildlife guideline #6, and as further described in Appendix A to the Forest Plan. Appendix A to the Plan

contains definitions and considerations in providing for elk security habitat at the project scale. In general, elk security habitat embodies considerations for both road densities and hiding cover. Further analysis of elk and elk security habitat is also contained in the Forest Plan FEIS and species assessment. An additional Forest Plan guideline (forestwide wildlife guideline #2) for protecting winter range and parturition areas also applies for elk, as well as the proper design of livestock improvements to be wildlife compatible.

Existing Condition: Elk use of the project area is yearlong. Management area 5.41 (winter range) occurs in the Tensleep, Rock Creek, and Beaver Creek drainages. Winter range is mapped in Appendix A of the Forest Plan. The elk in this project area are managed by the WGFD as part of Hunt Areas. Currently, all Hunt Areas are either at or above objective for elk populations.

Existing and potential elk security areas were identified through modeling conducted at the time of Forest Plan revision. The strategy and management guidance (Appendix A of Forest Plan) are specific to the geographic area for which there are five for this project. Existing and potential elk security areas identified in the model are shown in the Forest Plan Appendix A. Although the Hunt Mountain Travel Management Plan in the Beaver Creek/Shell Creek area improved the road situation and defined vehicular travel only to designated roads and trails, there are still open roads in the project area that have reduced the existing elk security. In addition, there has been considerable use of ATVs in the project area on closed roads and off-road, both unauthorized uses that degrade the validity of existing or potential elk security, though this use is not factored into the model. The project area has a considerable amount of habitat within the 2001 Roadless Rule, which means that no new roads or timber harvest will occur. In terms of cover, the project area does offer significant protection within the 5.41 areas, however much of this area is even aged stands that currently have large pockets of dead and dying timber from insect and disease, and have missed natural fire cycles through suppression efforts. There would be long term benefits from treatment of these areas for habitat improvement and reduced fire potential from large wildfires. Alternative 3 would affect some existing elk security, however dead stands are already fading in providing cover. Treatment of these stands would be of long term benefit as insect and disease continue to be an issue in this area. Any proposed burning of timber would be done in coordination with Wyoming Game and Fish Department to ensure adequate habitat protection for this species. There would be no effect on elk security habitat from alternatives 1 and 2, except for ongoing cumulative effects of potential wildfire.

Sage densities within the Beaver Creek portion of the project area were measured and estimated during the field season of 2007. Sagebrush within this area covers approximately 10,500 acres, typically occurring in dense stands of a mature age class. Alternative 3 proposes approximately 1500 acres, through prescribed burns or mechanical treatment, and would have a positive benefit by improving the quality and availability of forage for wildlife and livestock. Goodrich (1999) estimates a 3.8% decrease in under story herbaceous production for every 1 % increase in Wyoming big sagebrush canopy cover over 15%. In general, managing for levels of sage canopies as

described in Wyoming Interagency Vegetation Committee 2002, Management for Vasey Big Sagebrush and Mountain Big Sagebrush, would provide for the continued use of the habitat by elk as well as other sage dependent species.

Effects: The Bone Creek fire did reduce some potential and existing elk security on the east side of the Beaver Creek portion of the project area. Any proposed burning of timber in alternative 3 would be done in coordination with WGFD to ensure adequate habitat protection for this species is maintained. Proposed livestock grazing would not have a significant effect on forage. This determination is made with the assumption that the prescribed utilization standards would not be exceeded, in either alternative 2 or 3.

In terms of indirect effects, prescribed burning activities may temporarily displace elk from using an area, however this is a short term effect. For parturition areas identified in the project area, activities should minimize disturbance to wildlife from May 1 – June 30. This will minimize the potential disruption of elk and deer calving season as well as provide protection for other wildlife using this area in the spring.

Any new fences would be constructed to a specification (overall height and wire spacing) so as to minimize affects on big game movements. There would be no significant effect on big game movements from implementing alternative 3. Therefore, the Forest Plan Guideline that states, "Structural range improvements should be designed to benefit wildlife and livestock," would be fully met with this alternative.

The project would not affect the forest-wide or herd unit populations trends of elk, due to the small amount of habitat affected, and based on no effect to road densities within elk security. This determination is the same for all alternatives. The project is consistent with the objectives and strategies and guidelines established for elk as an MIS in the Forest Plan.

Red-breasted nuthatch

There is no specific management direction in the Forest Plan for nuthatches other than those strategies listed at the beginning of this document. A species assessment conducted for the Forest Plan provides further information on this species relative to the Forest. Additional Forest Plan guidelines (forest-wide biodiversity guidelines #4 and #10) for old growth and snags/coarse woody debris also apply for this species.

Existing condition: Red-breasted nuthatches are abundant in the project area and forest-wide as a year-round resident. They prefer mature conifer forests (Ghalambor and Martin 1999), and may favor old growth conditions in the Bighorn due to the provision for snags in this structural stage. Population monitoring for red-breasted nuthatches began at the Forest-wide scale during 2002 with avian point count monitoring, which continued on the Forest through 2007. At this point, specific monitoring on the Forest was scaled back to provide only the transects that contribute to the statewide bird monitoring effort, a more suitable level at which to monitor populations. Numerous detections of the species have occurred with monitoring in 2002 - 2007, indicating an adequate representation to detect trends from monitoring efforts (Hanni 2009), with no results indicative of management

related effects to trends. Records from the Breeding Bird Surveys (Sauer et al 2005) indicate a population trend that is up 3% at the statewide scale, while one of the two routes on the Forest indicates a downward trend of 17% (Bald Mt.), and the other with an upward trend of 12% (Crazy Woman), both being based on average counts of approximately 1.5 birds/yr. All breeding bird survey data is subject to variations and is generally not considered accurate at the route, and higher scales, primarily due to limited number of sightings. Red-breasted nuthatch populations are known to fluctuate annually in response to cone crops, among other influences.

Effects: Habitat for the red-breasted nuthatch could have direct effects through prescribed burning which would likely only change small pockets of timber to an open condition if crown fires occur. Prescribed burning could consume snags, but also typically creates snags. Prescribed fire would focus treatment on sage and conifer/aspen communities, and change in habitat would be minimal, immeasurable, and insignificant due to the fewer acres targeted relative to the forest-wide availability of habitat. Prescribed fire within timber stands to reduce fuels, create fire breaks, treat insect and disease, and improve habitat by creating uneven aged stands would reduce some habitat for this species. There would be long term benefits from these treatments for these species as mature stands return in these areas. Livestock grazing, recreation, or other management practices in forested areas do not typically affect nuthatches.

Indirect effects of the proposed action could include prescribed burning which would not likely take place during the nesting season due to fire risk, and thus no effect is likely from those activities. This project is within the context of the effects estimated in the Forest Plan FEIS for snags from changes in habitat structural stages, finding no significant effect to viability of species based on anticipated levels of harvest.

Cumulative effects would include firewood cutting by the public throughout the year in the project area, though this is typically of a small amount. Other cumulative effects as displayed in the project record could also apply, but none are thought to be of significance affecting the overall availability of habitat for this species. No change in the Forest population of this species is anticipated with respect to any of the alternatives, and the project effects would be within the realm of those assessed in the Forest Plan FEIS.

Red squirrel

There is no specific management direction in the Forest Plan for red squirrels other than those strategies listed at the beginning of this document for MIS in general. A species assessment conducted for the Forest Plan provides further information on this species relative to the Forest. Additional Forest Plan guidelines as mentioned for the red-breasted nuthatch also apply for this species. Canada lynx would rely on squirrels as a key prey species, however, lynx are not known to occur and management direction is not currently being applied for them.

Existing condition: Red squirrels are abundant in the project area and forest-wide as a year-round resident, fluctuating in populations largely in response to cone crops (Clark and Stromberg 1987). They prefer mature conifer forests, and may favor old growth

conditions in the Bighorn due to the provision for snags and coarse woody debris in this structural stage. Population monitoring for red squirrels began at the Forest-wide scale during 2002 associated with avian point count monitoring, although this was ceased after 2007 as there was no benefit to monitoring this species with regard to management activities' effects. Monitoring during the 5 year period indicated a typical fluctuation in species abundance (Hutton 2006; White 2007). There are no other population information sources known.

Effects: Direct, indirect, and cumulative effects to habitat for the red squirrel from the proposed action would be similar to those described for the red-breasted nuthatch. Recreational shooting of red squirrels (as they are small game) is not likely to have a significant mortality effect on their populations. The same effects from the no-action for the red-breasted nuthatch would also apply to the squirrel.

Population trends at the forest-wide scale would not be affected by this project, for any of the alternatives. Current populations are not considered at risk due to the amount of initial detections of this species in the forest-wide monitoring during 2002-2007. There would be no noticeable change to forest-wide habitat for this species that is not within the natural realm of variability such as through wildfire. The alternatives are consistent with the objectives and strategies and guidelines established for this MIS in the Forest Plan, which allow for changes in habitat structural stage diversity.

Brewer's sparrow

There is no specific management direction in the Forest Plan for the Brewer's sparrow other than those strategies listed at the beginning of this document. A species assessment conducted for the Forest Plan Revision provides further information on this species relative to the Forest. Additional Forest Plan guidelines (forestwide wildlife guidelines #3, #10, #11; biodiversity guideline #5) for protecting known locations of sensitive species, providing habitat for sage grouse, managing sagebrush, and consulting PIF management guidelines also apply for this species. Direction for management of livestock grazing in the Forest Plan also benefits this species when forage utilization requirements are followed, and additional rangeland vegetation and range improvements guidance are followed. This species was also addressed in the Biological Evaluation prepared for this project.

Existing condition: Brewer's sparrows are abundant in the project area and forest-wide, but are a migratory species, occupying mature sagebrush as their primary habitat in breeding grounds (Rotenberry et al 1999; Paige and Ritter 1999). The habitat management guidelines for Vasey Big Sagebrush and Mountain Big Sagebrush (Wyoming Interagency Vegetation Committee 2002) also provide beneficial guidance for managing this species.

Population monitoring for Brewer's sparrows began at the Forest-wide scale during 2002 with avian point count monitoring, running through 2007. Numerous detections of the species occurred, with typical fluctuations in the population trend, not associated with management activities on the Forest (Hutton 2006, White 2007). Given these variations, it was evident that monitoring at the Forest scale was not relevant for these birds, and

monitoring was scaled back to provide data into the statewide effort at tracking bird populations. Records from the Breeding Bird Surveys (Sauer et al 2005) indicate a population trend that is down 82% on the Bald Mt. route on the Forest, down 31% on the Crazy Woman route on the Forest, and down 1% at the statewide scale. The individual routes are based on an average count of 1 bird per route, so instances where 8 birds were detected in one year result in a drastic drop when only the average is counted most years. Neither survey route has a substantial portion of sagebrush habitat. All breeding bird survey data is subject to variations and is generally not considered accurate at the route, and higher scales, primarily due to limited number of sightings.

HCI models are not developed within HABCAP for this species. Therefore an assessment of sagebrush age class diversity in the project area was conducted. A combination of one hundred randomly run transects within sagebrush and existing vegetation mapping were used to develop canopy cover for the project area. Canopy cover as determined by line intercept transects, with high meaning greater than 20% canopy cover, medium as 5-20%, and low as less than 5%.

Effects: Habitat for the Brewer's sparrow would have direct effects from prescribed burning and any chemical or mechanical treatment of sagebrush. Mature conditions would be changed to younger, more open stands of sagebrush in areas treated, as shown in Table 4 below. Indirect effects in terms of disturbance of nesting birds is not likely, as these activities would not occur during the breeding season (due to green or muddy conditions). Implementation of prescribed burns has shown that areas treated still provide sparrow habitat, as moderate severity burns leave patches of mature sagebrush untreated, while other areas are consumed, all within the area ignited.

The proposed action estimates the treatment of 1500 acres for the next 10 years within proposed areas. The treatment of approximately 1500 acres of sagebrush from canopy cover class >20% would return existing conditions to desired conditions.

Table 4. Sage Canopy Cover Density Effects in Beaver Creek portion of the Big 6 Project Area

Desired Condition		Existing Condition (estimated)	
Canopy cover class	Percentage of landscape	Canopy cover class	Percentage of landscape
0-5%	10-20	0-5%	0
5-20%	20-30	5-20%	2
>20%	40-50	>20%	98

Maintain > 20% herbaceous spp.
Maintain > 70% ground cover

Compliance with the habitat management guidelines for Vasey Big Sagebrush and Mountain Big Sagebrush (Wyoming Interagency Vegetation Committee 2002) on sage grouse habitat, would satisfy habitat requirements for the Brewer's sparrow (Paige and Ritter 1999). Implementation would be adaptive, in that if a wildfire occurred that effectively lowered sage canopy densities, treatment may not need to occur and/or would be modified on the Forest.

Direct effects of the no-action may include a continued progression towards more mature sage conditions, favoring these birds in the short term. However, this mature canopy condition could also result in more widespread losses of sagebrush should wildfire occur. Resiliency in age class diversity would be better enhanced with alternative 3 than with alternatives 1 and 2. Proposed livestock grazing would not likely have a significant effect on forage. This determination is made with the assumption that the prescribed utilization standards will not be exceeded, even in the short term, for alternatives 2 and 3. Indirect effects are not likely from any of the alternatives.

Cumulatively, the largest threat to the sagebrush habitat in the project area would continue to be from noxious weeds. Prescribed burning may increase risk for weeds, as well as any mechanized disturbances. However, this has been mitigated through project design and weed surveys. In addition, the Hunt Mountain Prescribed burn is still in effect for treatment of sagebrush. This project would also fall under Wyoming Interagency Vegetation Committee guidelines, which should maintain adequate habitat for the Brewer's sparrow. The risk of catastrophic wildfire with hotter burn severities would outweigh the risk of the moderate severity prescribed burns that are typical on the Forest in this habitat type. Ongoing cumulative impacts from recreation use would continue. Some lands adjacent to the Forest have been treated with either fire or herbicide in the past, as viewed from aerial photos. These lands have fewer acres in high density and moderate density, with more in the low density. Specific acreages were not calculated for adjacent land, but they were informally surveyed through landowner permission for access. For Brewer's sparrow and sage grouse therefore, a spectrum of age class diversity that retains more high densities on the Forest was deemed appropriate.

In terms of forestwide habitat, the habitat is mostly comprised of mature or high sage density canopies. At approximately 1,000 to 2,500 acres treated per year forest-wide, the acres of mature continue to increase. Population trends at the forest-wide scale should not be affected by any of the alternatives due to the relatively small size of the acres being treated by this project. Current populations are not considered at risk due to the amount of initial detections of this species in the forestwide monitoring. There would be no noticeable change to forest-wide habitat for this species, because less than 1 percent of suitable habitat is affected at that scale. The alternatives are consistent with the objectives and strategies and guidelines established for MIS in the Forest Plan.

Additional Avian Species Analysis

The following tables demonstrate analysis for Wyoming Partners In Flight priority species and the U.S. Fish and Wildlife Service's list of Birds of Conservation Concern 2002), in compliance with the Executive Order mentioned at the beginning of this document. The use of asterisks identifies species that are addressed in the Biological Evaluation and Assessment conducted for the project.

Table 7. Wyoming PIF Priority Species

Species	Habitat	Assessment
Mountain Plover	Shortgrass prairie	Surveys conducted in 2002 and 2003 on the Forest failed to locate this species or potential habitat.
Trumpeter Swan	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Sage Grouse*	Shrub-steppe	No known leks on Forest, though summer habitat use within project area occurs. Refer to BE.
Baird's Sparrow	Shortgrass prairie	Known occurrences on Forest in grasslands and riparian areas. Requires taller herbaceous vegetation for nesting. Effects would be similar to those analyzed for the grasshopper sparrow in BE.
McCown's Longspur	Shortgrass prairie	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Ferruginous Hawk	Shrub-steppe	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Brewer's Sparrow*	Shrub-steppe	Known occurrences within project area. Refer to BE and MIS analysis above.
Wilson's Phalarope	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Franklin's Gull	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Sage Sparrow*	Shrub-steppe	Possible occurrences on Forest. Analysis of effects would be similar to the Brewer's sparrow in the BE and MIS above.
Swainson's hawk	Plains/Basin Riparian and shortgrass prairie	Possible occurrences within project area. Effects would be similar to those analyzed for grasshopper sparrow in BE.
Long-billed Curlew	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Short-eared Owl*	Shortgrass Prairie	Historic occurrence within project area and potential habitat. Refer to BE.
Northern Goshawk*	Conifer/Aspen	Possible occurrence within project area. Refer to BE.
Peregrine Falcon*	Cliffs	Possible occurrence within project area. Refer to BE.
Burrowing Owl	Shortgrass Prairie associated with prairie dog towns	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Forster's Tern	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Bald Eagle*	Cottonwood/Riparian	Foraging habitat used on Forest. Refer to the BE.
Upland Sandpiper	Shortgrass Prairie	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Black Tern	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.

Table 8. USFWS Birds of Conservation Concern (Bird Conservation Regions 10 and 17 – Northern Rockies and Great Plains - 2002)

Species	Habitat	Assessment
Swainson's hawk	Plains/Basin Riparian and shortgrass prairie	See Above.
Ferruginous Hawk	Shrub-steppe	See Above.

Golden eagle	Cliffs/Shrub-steppe/	Potential habitat in project area, though none currently known to nest in project area. Nests would be protected with temporal and spatial buffers if found as per the Forest Plan guidance if any found near enough to disturbances planned in alternative 3. Otherwise, no effect.
Peregrine Falcon*	Cliffs	Refer to BE.
Prairie Falcon	Cliffs/shrub-steppe/prairie	Potential habitat in project area, though none currently known to nest in project area. Nests would be protected with temporal and spatial buffers if found as per the Forest Plan guidance if any found near enough to disturbances planned in alternative 3, otherwise no effect.
Yellow Rail	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
American golden plover	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Mountain Plover	Shortgrass prairie	See above.
Snowy plover	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Upland Sandpiper	Shortgrass Prairie/wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Solitary sandpiper	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Whimbrel	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Long-billed Curlew	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Marbled godwit	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Sanderling	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Wilson's Phalarope	Wetlands	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Yellow-billed cuckoo	Plains Riparian	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Black-billed cuckoo	Plains Riparian	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Burrowing owl	Shortgrass prairie with prairie dog towns.	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Flammulated owl*	Conifer/Aspen	Refer to BE.
Short-eared owl*	Shortgrass prairie	Refer to BE.
Sage Grouse*	Shrub-steppe	Refer to BE.
Baird's Sparrow	Shortgrass prairie	See Above.
McCown's Longspur	Shortgrass prairie	Not analyzed due to lack of potential habitat and no known occurrences on Forest.
Brewer's Sparrow*	Shrub-steppe	Refer to BE and MIS analysis above.
Sage Sparrow*	Shrub-steppe	Refer to BE.
Northern Goshawk*	Conifer/Aspen	Occurrences within project. Refer to BE.

General Effects by Alternative:

Alternative 1 – No Action, no grazing

Direct and indirect effects: The removal of livestock grazing under this alternative would generally have no affect on, or be beneficial effects, for most wildlife species. Forest-dependent species (e.g., American marten, pygmy nuthatch) would not be affected. Habitat for some riparian-dependent species (e.g., beaver, moose) could be improved by the removal of livestock impacts in these areas.

The absence of livestock grazing in alternative 1 could move vegetative communities toward late seral. This equates to a higher percentage of sagebrush and an increase in fine fuels (grasses) which can increase wildfire intensity and the amount of vegetation burned. This could displace some individuals and reduce nesting and/or foraging habitat. In the short-term, there may be increased nesting cover/forage for some grassland dependent species with alternative 1.

For sagebrush dependent species (e.g., Brewer's sparrow), the increase in the sagebrush component and maturity could be beneficial in the short-term with alternative 1. However, the mature canopy condition could result in widespread sagebrush losses should wildfire occur. Additionally, increased sagebrush may have reduced forb production and will probably have negative impacts to approximately 11,000 acres of sagebrush habitat. Goodrich (1999) estimates a 3.8% decrease in understory herbaceous production for every 1% increase in Wyoming big sagebrush canopy cover over 15%.

Short-term effects on elk (MIS) and deer (demand species) would include an increase in forage availability across the entire analysis area. A long-term effect may be a decrease in forage diversity and quality as the sagebrush component increases at the expense of other forage.

Long-term effects on elk (MIS), deer (demand species), and forest dependent species could include loss of winter shelter and habitat due to tree loss by beetle and disease across lower elevations of the project area. This would also provide the maximum of forage quantity to big game animals within the deer and elk winter range since there would be no livestock grazing on the big game winter range within this project area. Improvement in the quantity and quality of forage (range condition) on big game winter ranges would be expected.

Alternative 2 – No Change, grazing under current management

Direct and indirect effects: The amount and availability of forage would not change as this is a continuation of current management. The utilization levels and standards specified in this alternative should be adequate to maintain sufficient forage/cover for wildlife species as determined in the Forest Plan. Indicators for this analysis include utilization levels on shrubs and aspen, utilization standards, and stubble height specifications.

The effects of implementing this alternative on elk would be to maintain the current situation. Elk numbers are currently at or above objective in this area, and it appears that current management is fully meeting the forage requirements for this indicator species. Elk security habitat (per the 2005 Forest Plan) would not be impacted by this activity nor

would any winter range or parturition areas. For other forested-dependent species (squirrel, red-breasted nuthatch), there would be no direct effects as livestock grazing would not alter forested cover types. No detectable change to elk, squirrel, or nuthatch population levels or habitat use would result from this alternative.

Habitat for some riparian-dependent species (e.g., beaver) could be impacted by bank trampling, increased sedimentation, and increased E. coli levels within riparian areas. The reduction in streamside vegetation associated with grazing could also affect nesting songbirds or other wildlife.

For sagebrush dependent species (e.g., Brewer's sparrow), the increase in the sagebrush component and maturity could be beneficial in the short-term. However, the mature canopy condition could result in widespread sagebrush losses should wildfire occur. Additionally, increased sagebrush may have reduced forb production and will probably have negative impacts to approximately 11,000 acres of sagebrush habitat. Goodrich (1999) estimates a 3.8% decrease in understory herbaceous production for every 1% increase in Wyoming big sagebrush canopy cover over 15%.

For terrestrial wildlife species of local concern, there is minimal potential habitat for the forested associated species (pygmy nuthatch and calliope hummingbird), and even less potential habitat that would be disturbed. There are no cave or rock outcrop features to be disturbed that bats may inhabit. There are no direct or indirect effects for the species of local concern beyond those anticipated in the Forest Plan FEIS (USDA Forest Service 2005), to which this analysis is tiered and incorporates by reference. There would be no change in the viability determinations for these species from those made in the Forest Plan FEIS (USDA Forest Service 2005).

Mule deer, moose, black bear, mountain lion, blue grouse, turkey, and sharp-tailed grouse (demand species) all may inhabit the project area at various times. Based on the amount of habitat in the watersheds and the minimal effects on the vegetative resource expected from implementing this alternative, potential effects are anticipated to be incalculable.

Long-term effects on elk (MIS), deer (demand species), and forest dependent species could include loss of winter shelter and habitat due to tree loss by beetle and disease across the lower elevations of the project area.

Alternative 3 – Proposed Action, grazing with adaptive management

Direct and indirect effects: Under alternative 3, the livestock grazing effects on species of local concern, demand species, and MIS would be the same as in alternative 2, discussed above, with the exception that any degraded areas from grazing may be recovered more quickly with adaptive management.

The effects of prescribed burning under this alternative vary depending on species habitat requirements/preferences.

For grassland- and sagebrush-dependent species (e.g., Swainson's hawk, sage grouse), the sagebrush treatment under this alternative would create short-term adverse effects – displacement and loss of nesting and/or foraging habitat. Potential for loss of nesting habitat would be minimal as burning is not likely to take place during nesting season when conditions are not optimal and the timing of mowing can be carefully controlled.

Mechanical treatments would not occur from May1 to July 15 to protect these sagebrush-dependent species and ground nesting songbirds. The long-term effect would be beneficial as forage quality and diversity increase in response to the prescribed burning. Prescribed burning or mowing would also reduce the potential for widespread sagebrush and grassland habitat loss from wildfire by reducing the amount of mature sagebrush canopy and fine fuels.

Short-term effects of sagebrush treatment on species that are habitat generalists (e.g., elk, deer, black bear, and mountain lion) would be similar to those described for grassland- and sagebrush-dependent species – temporary displacement and loss of forage/prey. However, this is a minor impact because these species can find shelter or forage in a variety of habitats. The long-term beneficial effect would be an improvement in forage diversity and quality and an increase in forage availability across the entire analysis area.

There is small potential for spread of noxious weeds following sagebrush treatment (prescribed burning, chemical, or mechanical) under alternative 3. Spreading weed infestations could limit forage, cover, and habitat available to wildlife. Infestations along riparian corridors could reduce ecological and riparian functioning, causing an impact to riparian-dependent species. Design criteria (see chapter 2) would be applied to reduce this risk, including avoiding ground disturbance (burning) in existing weed patches or using chemical treatments in some areas.

Cumulative Effects – Wildlife

Chapter 3 of the EIS for this project has a table with a list of activities that have the potential for cumulative effects when combined with the effects from the alternatives: livestock grazing, recreation, and other prescribed burning projects. Livestock grazing can promote mature brush conditions but limit forbs and riparian area health (Connelly et al. 2000). Recreation use includes use of the road network primarily for hunting, but also for motorized recreation in general, possibly causing some disturbance to grouse and other species (Ingelfinger 2001). Other prescribed burning projects being considered at this time include treatments on the BLM land in the southwest corner of the project area primarily in juniper types, and private land prescribed burning along the southern forest boundary. Similar mosaics are anticipated, which may actually improve habitat conditions as compared to historical sagebrush spraying conducted on these private lands.

The temporal boundary for wildlife effects analyses varies by the type of activity and the habitat types. The length of time the project area would be affected by livestock grazing and recreation activities is indefinite as these activities are ongoing. The length of time prescribed burning will affect the landscape varies by habitat type. For example, effects in sagebrush might last for 20 years; effects in forest vegetation types (juniper, aspen, conifer, etc.) may last 50 to 80 years.

The spatial boundary for the wildlife effects analysis varies by species. For most wildlife species, the spatial boundary is 2 miles beyond the project area.

Alternative 1 – the removal of livestock grazing would result in more sagebrush and fine fuels. This effect, combined with the effects of past fire suppression and the increase in insect and disease outbreaks in forested vegetation, would increase the risk of large scale

more intense wildfire and larger changes to forest-brush-grass habitat conditions. The habitat loss from more widespread, severe fire could impact all species by reducing habitat and forage in the short-term. In the long-term, grassland-dependent species and habitat generalists could benefit from increase forage production. For other species, such as tree nesters, the time for conifers to regenerate and habitat to recover would be much longer.

Alternative 2 – the continuation of livestock grazing would maintain current habitat conditions on the analysis area. Livestock grazing would slow the progression of vegetation to late seral but would not reduce the current amount of overmature sagebrush canopy. This would slightly increase the risk of widespread, more intense wildfire, but that risk is insignificance compare to the effects of insect and disease outbreaks in the area. Other prescribed burning and aspen regeneration/meadow encroachment projects in the area could offer additional vegetative diversity. Livestock management activities such as fences under this alternative may create barriers for species such as elk and deer during calving periods.

Alternative 3 – the cumulative livestock grazing effects under this alternative would be the same as those discussed above for alternative 2. The sagebrush treatment would reduce the sagebrush-fine fuels component in the area. This could help offset the risk of widespread, more intense wildfire resulting from past wildfire suppression and insect and disease outbreaks in the forested vegetation. In combination with other prescribed burning projects and aspen regeneration/meadow encroachment projects in the area, this alternative would offer greater vegetative diversity over the long-term.

Alternative 3 would not affect the forestwide or herd unit population trends for elk, because there is no effect to elk security areas and only a small amount of habitat is affected. Alternative 3 is consistent with forest plan objectives, strategies, and guidelines for elk as an MIS.

There would be no significant effect on big game movements; any fencing under this alternative would be designed to minimize barriers to wildlife passage. Additionally, fencing is planned to be significantly reduced. Forest plan direction for structural range improvements would be fully met.

No project activities would cumulatively affect beaver populations or their habitat. Cumulative effects to beaver habitat within the project area are primarily related to livestock use of forage in riparian areas, where willow or aspen may be suppressed, particularly in conjunction with wildlife browsing. The proposed alternative would allow multiple tools (i.e. addition riders, fencing, salt, water developments, number reductions, rotation) to improve existing management which should decrease potential cumulative effects.

There is the potential for spread of noxious weeds with the prescribed burning under alternative 3 and a cumulative impact with other activities that can expand noxious weed infestations – recreation use, other prescribed burning projects, weed infestations on private land. The cumulative risk of spreading noxious weeds and reducing habitat quality for grassland- and sagebrush-dependent species under this alternative would be minimized by the application of design criteria described in chapter 2.

CONSISTENCY DETERMINATION *(between the proposed action and wildlife standards and guidelines described in the Bighorn National Forest 2005 Forest Plan)*

The alternatives, as described above, is consistent with applicable Forest-wide threatened, endangered, sensitive species and wildlife standards and guidelines defined within the *Bighorn National Forest Land and Resource Management Plan Forest Plan* (USDA Forest Service 2005). The alternatives are also consistent with the desired conditions for wildlife habitat specific to the management area prescription land allocations and it conforms to the desired wildlife habitat conditions identified for the project area.

In addition to the rationale provided under the analysis for each species, this analysis was found to be within the range of anticipated effects for each of the species as described in the Forest Plan FEIS, to which this analysis is tiered.

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Appendix A. Plant Communities and Structural Stage within the Big 6 Range AMP Analysis Area.

AnalysisArea	PlantCommunity		1M	1T	2S	2T	3A	3B	3C	4A	4B	4C	**Grand Total**
Beaver Creek	Aspen					3.73	87.96			100.92	12.81	18.38	**223.80**
	Bare/Rock	2617.57											**2617.57**
	Cottonwood Riparian							20.21					**20.21**
	Douglas-Fir					3079.80	2001.77	4083.45	3736.10	224.06	1111.79	4101.55	**18338.52**
	Lodgepole Pine					361.67	47.76	744.43	596.30	107.74	278.70	428.51	**2565.11**
	Mountain Grassland		20913.88	145.07		65.71							**21124.67**
	Mountain Shrub				2939.69								**2939.69**
	Pinyon/Juniper and/or Limber Pine					38.26	1040.11	274.78	69.75	145.74	319.64		**1888.28**
	Sagebrush				10497.48								**10497.48**
	Spruce/Fir					2291.55	1055.27	1223.12	998.53	560.90	1503.78	2939.08	**10572.23**
	Wet Meadow				140.65								**140.65**
Beaver Creek Total		2617.57	20913.88	145.07	13577.83	5840.72	4232.87	6345.99	5400.68	1139.35	3226.73	7487.52	**70928.22**
Beaver Creek Rx Units	Aspen									44.66			**44.66**
	Bare/Rock	1022.10											**1022.10**
	Cottonwood Riparian							20.21					**20.21**
	Douglas-Fir					397.47	446.06	1701.37	1145.91	65.74	380.73	300.78	**4438.06**
	Lodgepole Pine					64.19	1.63	37.03	30.14	76.49	119.93	24.30	**353.72**
	Mountain Grassland		4806.70	24.72									**4831.42**
	Mountain Shrub				2484.32								**2484.32**
	Pinyon/Juniper and/or Limber Pine					36.55	416.16	192.68	26.95	0.26			**672.60**
	Sagebrush				3320.51								**3320.51**
	Spruce/Fir					1022.42	246.65	241.60	148.47	53.21	371.37	339.48	**2423.20**
	Wet Meadow				10.20								**10.20**
Beaver Creek Rx Units Total		1022.10	4806.70	24.72	5815.03	1520.63	1110.51	2192.89	1351.47	240.36	872.04	664.57	**19621.01**

Goose Creek	Aspen						24.51	222.12		0.02	57.93	5.82	**310.40**
	Bare/Rock	4421.98		1014.96									**5436.94**
	Cottonwood Riparian										1.77		**1.77**
	Douglas-Fir					500.22	58.07	800.59	2294.72	35.77	436.31	725.93	**4851.60**
	Lodgepole Pine					516.70	1506.35	16332.16	34938.07	734.88	4362.57	7609.50	**66000.22**
	Mountain Grassland		11701.54	372.60									**12074.15**
	Mountain Shrub				54.69								**54.69**
	Pinyon/Juniper and/or Limber Pine					53.12	434.62	485.74	14.29	50.52	54.75	1.52	**1094.56**
	Ponderosa Pine					178.20	55.53	348.75	524.40	34.89	196.37	34.66	**1372.81**
	Sagebrush				84.70								**84.70**
	Spruce/Fir						3170.82	5750.18	3725.43	1402.33	2378.96	2912.82	**19340.54**
	Wet Meadow				191.61								**191.61**
Goose Creek Total		4421.98	11701.54	1387.56	330.99	1248.23	5249.91	23939.53	41496.91	2258.41	7488.67	11290.25	**110813.98**
Little Horn River	Aspen					39.16	340.73	264.22		129.25	233.58		**1006.94**
	Bare/Rock	4193.68		887.94									**5081.62**
	Douglas-Fir					3189.74	844.51	3941.28	9368.45	162.49	2785.65	5706.92	**25999.03**
	Lodgepole Pine					100.01	312.86	946.41	2548.56	128.94	318.81	936.94	**5292.55**
	Mountain Grassland		20124.73	498.92		41.64							**20665.29**
	Mountain Shrub				1010.94								**1010.94**
	Pinyon/Juniper and/or Limber Pine					759.34	1541.52	1980.95	516.63	111.96	725.76	108.53	**5744.70**
	Ponderosa Pine					1207.48		156.07	75.13	78.07	298.69	75.03	**1890.46**
	Sagebrush				3486.75								**3486.75**
	Spruce/Fir					1016.06	1697.71	3857.09	6153.45	949.89	5169.58	12437.83	**31281.61**
	Wet Meadow				454.01								**454.01**
Little Horn River Total		4193.68	20124.73	1386.86	4951.69	6353.43	4737.32	11146.03	18662.22	1560.60	9532.08	19265.25	**101913.90**
Little Horn Rx Units	Aspen						186.63	60.25		103.99	75.18		**426.04**
	Bare/Rock	1036.97											**1036.97**
	Douglas-Fir					4.46	30.29	221.06	52.59	11.07	141.25	170.89	**631.60**

	Lodgepole Pine					19.43	11.01	33.93	149.61	105.30	32.14	12.85	**364.26**
	Mountain Grassland		6255.74	32.25									**6287.99**
	Pinyon/Juniper and/or Limber Pine						131.55	60.52			6.43	29.81	**228.31**
	Ponderosa Pine					9.57					3.75		**13.32**
	Sagebrush				925.58								**925.58**
	Spruce/Fir						296.47	510.05	519.50	123.13	756.34	675.86	**2881.35**
	Wet Meadow				371.58								**371.58**
Little Horn Rx Units Total		1036.97	6255.74	32.25	1297.16	33.45	655.94	885.81	721.70	343.48	1015.09	889.41	**13166.99**
Rock Creek	Aspen					10.26	168.76	328.78	141.61	89.32	430.44	168.44	**1337.61**
	Bare/Rock	138.91		113.99									**252.90**
	Cottonwood Riparian							23.36					**23.36**
	Douglas-Fir								171.56				**171.56**
	Lodgepole Pine					189.91	207.64	2911.18	13686.15		713.51	3691.44	**21399.83**
	Mountain Grassland		1431.51										**1431.51**
	Ponderosa Pine						3.71	379.77	321.14	308.98	368.82	130.19	**1512.62**
	Sagebrush				38.41								**38.41**
	Spruce/Fir						6.42	582.64	297.47		639.31	1086.51	**2612.34**
	Wet Meadow				18.64								**18.64**
Rock Creek Total		138.91	1431.51	113.99	57.04	200.17	386.52	4225.73	14617.94	398.30	2152.08	5076.58	**28798.78**
Tensleep Creek	Aspen						359.58	231.77	50.60	46.41			**688.36**
	Bare/Rock	9211.35		654.44		88.02							**9953.81**
	Cottonwood Riparian							94.20		12.16	100.56		**206.93**
	Douglas-Fir						389.22	2856.91	2985.37	868.89	1218.54	1738.66	**10057.58**
	Lodgepole Pine					458.20	1307.89	7473.24	7529.75	712.55	4408.85	4261.82	**26152.29**
	Mountain Grassland		16756.91	284.89									**17041.80**
	Mountain Shrub				390.37								**390.37**
	Pinyon/Juniper and/or Limber Pine						606.93	675.47	11.68		266.73	70.37	**1631.19**

	Ponderosa Pine						201.35	2227.85	79.08	44.64	96.88	93.25	**2743.06**
	Sagebrush				6350.14								**6350.14**
	Spruce/Fir						1840.38	2139.40	936.98	867.27	4164.32	3202.20	**13150.55**
	Water	10.89											**10.89**
	Wet Meadow				724.12								**724.12**
Tensleep Creek Total		9222.24	16756.91	939.33	7464.62	546.22	4705.36	15698.84	11593.46	2551.92	10255.89	9366.29	**89101.08**
Grand Total		**22653.43**	**81991.03**	**4029.78**	**33494.38**	**15742.85**	**21078.43**	**64434.81**	**93844.38**	**8492.42**	**34542.58**	**54039.87**	**434343.96**